

**REMARKS**

Claims 11-20 are pending in this application. By this Amendment, claim 11 is amended. Support for the amendment to claim 11 can be found, for example, in the specification at page 2, line 26 – page 3, line 16. No new matter is added.

The courtesies extended to Applicants' representative by Examiners Han and Yuan at the interview held May 22, 2009, are appreciated. The reasons presented at the interview as warranting favorable action are incorporated into the remarks below, which constitute Applicants' separate record of the interview.

In view of the foregoing amendments and following remarks, reconsideration and allowance of the application are respectfully requested.

**I. Rejections Under 35 U.S.C. §103****A. Landsman and Hodgdon**

The Office Action rejects claims 11-13, 15-18 and 20 under 35 U.S.C. §103(a) over U.S. Patent No. 5,480,735 to Landsman et al. ("Landsman") in view of U.S. Patent No. 5,118,717 to Hodgdon et al. ("Hodgdon")<sup>1</sup>. Applicants respectfully traverse the rejection.

Landsman and Hodgdon, individually or in combination, would not have rendered obvious each and every feature of claim 11. By this Amendment, claim 11 recites, *inter alia*, "Alkali fuel cell comprising a solid stack consisting of ... a hydroxide ion conducting solid membrane ... wherein, each electrode comprises an active layer that is in contact with the solid membrane ... the element conducting hydroxide ions of the active layer of each of the electrodes being a polymer having vinylaromatic units comprising a quaternary ammonium function and hydroxide counter-ions OH<sup>-</sup> being associated with the quaternary ammonium

---

<sup>1</sup> Applicants note that the Office Action, on page 2, rejects claims 11-13, 15-19 and 20 under 35 U.S.C. §103(a) over Landsman and Hodgdon. However, claim 19 is separately rejected on page 5 of the Office Action and, thus, Applicants believe that including claim 19 in this rejection was a typographical error.

functions of the polymer, and the fuel cell not comprising any alkaline liquid." (Emphasis added).

The Office Action, on pages 2-3, acknowledges that "Landsman et al. does not disclose a solid membrane." However, the Office Action asserts that Landsman discloses that hydroxide ions pass through an electrolyte liquid and a matrix, and that the electrolyte-filled matrix of Landsman and the claimed solid membrane for conducting hydroxide ions are considered functionally equivalent ion conducting methods. See Office Action, page 3.

The Office Action further acknowledges that Landsman fails to disclose electrodes having a polymer comprising a quaternary ammonium group that conducts hydroxide ions. See Office Action, page 3. Thus, the Office Action applies the disclosure of Hodgdon to allegedly address the discrepancies of Landsman. The Office Action asserts that Hodgdon discloses an anion exchange polymer having a vinylaromatic group and a quaternary amino group with a chloride counter ion. *Id.* The Office Action concludes that it would have been obvious to one of ordinary skill in the art to have applied the anion exchange polymer of Hodgdon to the electrodes in the fuel cell of Landsman because Hodgdon discloses that its anion exchange polymer decreases caustic degradation and organic fouling. However, Applicants respectfully assert that it would not have been obvious to one of ordinary skill in the art to have modified the electrodes of Landsman with the anion exchange polymer of Hodgdon.

As discussed during the interview, and acknowledged by the Office Action, Landsman is directed to an alkaline liquid fuel cell. In contrast, the fuel cell of present claim 11 is directed to a solid membrane fuel cell that does not comprise any alkaline liquid. Therefore, the physical and chemical compositions of the fuel cell disclosed in Landsman and the claimed fuel cell differ to accommodate the important differences between a fuel cell with an alkaline liquid and a solid membrane fuel cell. The Office Action provides no reason or

rationale for one of ordinary skill in the art to have modified the fuel cell of Landsman to comprise a hydroxide ion conducting solid membrane without any alkaline liquid. The Office Action merely asserts that the solid membrane recited in claim 11 is a functional equivalent of the alkaline liquid and matrix membrane of Landsman. However, there is no reason or rationale in the Office Action, Landsman or Hodgdon that the components of Landsman, even if modified as suggested in the Office Action, would be compatible with a solid membrane fuel cell and would provide an operational product with any reasonable expectation of success.

Indeed, the electrodes of Landsman are specifically configured to optimize the performance of a liquid fuel cell. For example, Landsman discloses that the electrodes include a catalyst layer comprising hydrophobic binder, catalyst particles, and hydrophilic particles. See Landsman, col. 3, lines 16-20. Further, the catalyst layer of Landsman "includes hydrophilic particles in an amount effective to provide a network of liquid transport pathways throughout the catalyst layer of the electrode." Landsman, col. 4, lines 3-5. Thus, Applicants respectfully assert that even if the electrodes of Landsman were modified with the anion exchange polymer of Hodgdon, as asserted in the Office Action, there is no reason for one of ordinary skill in the art to have expected that the modified electrodes would be compatible with a solid hydroxide ion conducting membrane fuel cell as recited in claim 11. Accordingly, Applicants respectfully assert that it would not have been obvious to one of ordinary skill in the art to have used a solid hydroxide ion conducting membrane in place of the alkaline liquid of Landsman.

Additionally, Applicants respectfully assert that it would not have been obvious to one of ordinary skill in the art to have modified the electrodes of Landsman with the anion exchange polymer disclosed in Hodgdon. The Office Action asserts that it would have been obvious to have used the anion exchange polymer of Hodgdon in the electrode of Landsman

to decrease caustic degradation and organic fouling. See Office Action, page 3. However, there is no indication that either of these conditions are problematic in the electrode disclosed in Landsman. Further, there is no reason or rationale provided in the Office Action or either of the references so that one of ordinary skill would have desired to include an anion exchange polymer in each of the electrodes disclosed in Landsman. Furthermore, the electrodes of Landsman must also have catalytic and electronic conducting properties and, thus, one of ordinary skill in the art would not have known how the specific polymer layer of Hodgdon would affect the electrodes of Landsman, or if the anion exchange polymer of Hodgdon would even be effective when used in an electrode as disclosed in Landsman. Accordingly, Applicants respectfully assert that it would not have been obvious to one of ordinary skill in the art to have modified the electrode of Landsman with the anion exchange polymer of Hodgdon as asserted in the Office Action.

For at least the above reasons, claim 11 would not have been rendered obvious by Landsman and Hodgdon, individually or in combination. Claims 12, 13, 15-18 and 20 variously depend from claim 11 and, thus, also would not have been rendered obvious by Landsman and Hodgdon, individually or in combination. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

**B. Landsman, Hodgdon and Yokoyama**

The Office Action rejects claim 14 under 35 U.S.C. §103(a) over Landsman and Hodgdon, as applied to claims 11-13, 15-18 and 20 above, and further in view of U.S. Patent No. 4,374,924 to Yokoyama et al. ("Yokoyama"). Applicants respectfully traverse the rejection.

For at least the reasons stated above, Landsman and Hodgdon, individually or in combination, would not have rendered obvious each and every feature of claim 11. Further, Yokoyama is not applied to address the discrepancies of Landsman and Hodgdon as to

claim 11. Therefore, Landsman, Hodgdon and Yokoyama, individually or in combination, would not have rendered obvious each and every feature of claim 11.

Claim 11 would not have been rendered obvious by Landsman, Hodgdon and Yokoyama, individually or in combination. Claim 14 depends from claim 11 and, thus, also would not have been rendered obvious by Landsman, Hodgdon and Yokoyama, individually or in combination. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

**C. Landsman, Hodgdon and MacDonald**

The Office Action rejects claim 19 under 35 U.S.C. §103(a) over Landsman and Hodgdon, as applied to claims 11-13, 15-18 and 20 above, and further in view of U.S. Patent No. 5,037,858 to MacDonald et al. ("MacDonald"). Applicants respectfully traverse the rejection.

For at least the reasons stated above, Landsman and Hodgdon, individually or in combination, would not have rendered obvious each and every feature of claim 11. Further, MacDonald is not applied to address the discrepancies of Landsman and Hodgdon as to claim 11. Therefore, Landsman, Hodgdon and MacDonald, individually or in combination, would not have rendered obvious each and every feature of claim 11.

Claim 11 would not have been rendered obvious by Landsman, Hodgdon and MacDonald, individually or in combination. Claim 19 depends from claim 11 and, thus, also would not have been rendered obvious by Landsman, Hodgdon and MacDonald, individually or in combination. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

**II. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of the application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



William P. Berridge  
Registration No. 30,024

Nicolas A. Brentlinger  
Registration No. 62,211

WPB:NAB/nab

Date: May 26, 2009

**OLIFF & BERRIDGE, PLC**  
**P.O. Box 320850**  
**Alexandria, Virginia 22320-4850**  
**Telephone: (703) 836-6400**

<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
--